

Some Early Similarities and Later Differences Between Bertrand Russell and B. F. Skinner

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B. F. Skinner credited Bertrand Russell with converting him to behaviorism and with writing one of the books that most influenced him. Particularly in Skinner's early work, there are similarities between Skinner and Russell that extend across mathematics, determinism, positivism, verbal behavior, future communities, evolution, and pragmatism. Later, Skinner's views changed, and he parted company with Russell in most of these areas. Perhaps the most dramatic and fundamental departure came when Skinner embraced pragmatism, which Russell said he "hated." However, there was a time during which Russell wrote favorably of pragmatism as a view for science. Although the similarities between Skinner and Russell may have resulted from common cultural influences, Russell appears to deserve credit for leading Skinner into the stimulus–response behaviorism of two-term necessities; he may also deserve some credit for helping to lead him out of it and into the selectionist behaviorism of three-term contingencies.

Key words: determinism, evolution, future community, mathematics, positivism, pragmatism, Russell, Skinner, verbal behavior

B. F. Skinner's later views show a substantial change from his earlier views, but the differences were not always well marked as changes by Skinner, and all the differences do not appear at the same point in time (Moxley, 1998). In general, Skinner's original positions are consistent with a stimulus–response behaviorism of two-term necessities and his changes are consistent with a selectionist behaviorism of three-term contingencies that characterizes his radical behaviorism. But this distinction does not readily indicate the particulars of the differences, several of which have been detailed elsewhere (e.g., Moxley, 1997a, 1997b, 1999b). One way of looking at the changes in Skinner's views is to see them as similar to the differences between two philosophers, Bertrand Russell and C. S. Peirce. This has the advantage of unifying Skinner's earlier stimulus–response views in similarity to Russell's views and unifying Skinner's later selectionist views in similarity to Peirce's views. My intention here and in recent

articles for *Behavior and Philosophy* (1996, 1997a, 1997b, 1999b, 2001a), *The Behavior Analyst* (1998, 1999a, 2001b, 2002), *American Psychologist* (1992), and *The Analysis of Verbal Behavior* (2001/2002), a series pretty much completed, is to make the changes in Skinner's views more conspicuous and more understandable. The early stimulus–response Skinner should be routinely distinguished from the later selectionist Skinner, just as the early Wittgenstein is routinely distinguished from the later Wittgenstein.

For example, Skinner has been most widely criticized for his stimulus–response views and for the views he presented in *Walden Two* with a defense of some its positions in *Beyond Freedom and Dignity*. However, both books are appropriately seen as belonging to Skinner's early stimulus–response position or its underlying philosophy. He largely replaced those views with selectionist views. *Walden Two* has more in it that is designed to resist the influence of consequences than to build upon them (Moxley, 1999a) and has more similarities with Russell than Peirce. When Skinner's stimulus–response views are put aside, his selec-

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tionist views are left; these selectionist views should receive more widespread attention and evaluation than they have.

Inasmuch as the similarities between Peirce and Skinner have been detailed elsewhere (Moxley, 2001a, 2001b, 2001/2002, 2002), this paper is devoted to detailing some of the similarities between Russell and the early Skinner in mathematics, determinism, positivism, verbal behavior, future communities, evolution, and pragmatism as well as their later differences as Skinner changed to a selectionist position. One curious feature of Russell's early views was his various and conflicting presentations of pragmatism. Skinner later adapted pragmatic views, ultimately in greater similarity to Peirce than to Russell, and this issue will receive special attention.

The question of influence will naturally arise, but it will not be decisively answered by the similarities between the views of Russell and the early Skinner. Similar views may have resulted from the influence of Russell on Skinner, but similar cultural influences may also account for similar views arising independently in Russell and Skinner. It is unlikely that the explanation entirely depends on one source or the other. Skinner has acknowledged Russell as an early influence more than he has acknowledged any other philosopher except possibly Bacon. But even to find Russell of interest meant that Skinner was likely to have been prepared by some values in his culture that were common to Russell's culture. They both, for example, shared a common "Western" and "modernist" culture with a high regard for science (cf. Moxley, 2001a). In whatever way the similarities between Russell and the early Skinner came about, the contrast between the views of the early Skinner and the later Skinner still holds. The following addresses the similarities between Russell and the early Skinner, their later differences, and the role of pragmatism.

EARLY SIMILARITIES BETWEEN RUSSELL AND SKINNER

Skinner acknowledged that Russell influenced him in more than one way. However, Skinner was not very specific on the details of this influence. For example, Skinner (1956/1999a) said,

Shortly after I was graduated from college Bertrand Russell published a series of articles in the old *Dial* magazine on the epistemology of John B. Watson's *Behaviorism*. . . . Many years later . . . I told Lord Russell that his articles were responsible for my interest in behavior. (pp. 110–111)

Skinner (e.g., 1976, pp. 298–299; 1979/1984, p. 10; 1989, pp. 121–122; 1977/1978, p. 113) credited Russell more than once for leading him into behaviorism. After reading Russell's (1926) review of *The Meaning of Meaning* by Ogden and Richards, Skinner (1989) said in more detail, "I bought Watson's book [*Behaviorism* (1924/1970)]. . . . Later I bought Russell's *Philosophy* (1927) [published in America as *An Outline of Philosophy* 1927/1970], in which he treated a few mentalistic terms in a behavioristic way. Although I never had a course in psychology, I became an instant behaviorist" (pp. 121–122). Skinner (1930/1999) also attributed the *Dial* series of articles with having influenced his writing of "The Concept of the Reflex in the Description of Behavior":

I believe the clue to the definition of reflex came from Bertrand Russell. Somewhere, possibly in a series of articles in the *Dial* in the late 20's, Russell pointed out that the concept of the reflex in physiology had the same status as the concept of force in physics. (p. 475)

In addition, Skinner (1984) acknowledged Russell's influence on the problem of knowledge: "I often called epistemology my first love. A few references to the problem of knowledge by Russell were the original enticement" (p. 395). More specifically, identifying the five or six "books that have been most important in leading me to my present position as a behaviorist," Skinner (1986a) said, "I was greatly

influenced by the first third of Bertrand Russell's *The Problems of Philosophy*." In that part of the book that Skinner said greatly influenced him, Russell (1912/1959) laid the foundations for a positivist perspective. In that book, Russell also distinguished between knowledge by acquaintance and knowledge by description, terms that Skinner would later employ and transform into contingency-shaped and rule-governed behavior. Skinner (1945, p. 270; 1957, pp. 13, 18, 87, 314, 322, 327, 449–450, 453–454; 1974, p. 234) also frequently referred to and quoted from Russell's *An Inquiry into Meaning and Truth*, which he typically presented as having views he now opposed. In his preface to that work, Russell (1950) said, "As will be evident to the reader, I am, as regards method, more in sympathy with the logical positivists than with any other existing school" (p. 9). From 1945 onward, Skinner specifically distanced himself from Russell and the logical positivists.

Mathematics

Russell. More comfortable with the formal relations of mathematics than the concrete aspects of science, Russell (1927/1996) had an early interest in both:

From the age of eleven, when I began the study of Euclid, I had a passionate interest in mathematics, combined with a belief that science must be the source of all human progress. . . . I hoped to pass from mathematics to science. . . . But it turned out that, while not without aptitude for pure mathematics, I was completely destitute of the concrete kinds of skill which are necessary in science. Moreover, within mathematics it was the most abstract parts which I understood best: I had no difficulty with elliptic functions, but could never succeed in mastering optics. Science was therefore closed to me as a career. (p. 5)

Russell found it easier to reason in terms of mathematics and logic with their necessary connections than to reason in terms of concrete, empirical events and their probabilistic relations.

Skinner. Although Skinner had taken his undergraduate degree in literature, he showed an interest in mathematical formulas and an inclination to intro-

duce them in his early research. Skinner apparently believed that the discovery of necessity in behavior might be accomplished in formal detail. In addition to his early affirmation of the importance of the necessity of the reflex, Skinner presented formulas such as " $R = f(S, A)$ " (1931, p. 452); " $N = Kr^n$ " (1932b, p. 47); and " $N = K \log t + C + ct$ " (1933, p. 341). Skinner (1980, pp. 194–195) later noted the similarity between his formula, $R = f(S, A)$ and Tolman's (1935) formula:

$B = f(S, H, T, P)$ in which B stood for behavior, as my R stood for response, S for the "environmental stimulus setup" (my S), H for heredity, T for "specific training" (my "conditioning"), and P for "a releasing internal condition of appetite or aversion" (my "drive"). (p. 195)

Skinner (e.g., 1979/1984, p. 206) showed some concern here to establish his priority for views that were similar to ones that Tolman adopted.

Skinner seemed to be on the lookout for any opportunity to apply mathematical expressions. He (1940) expressed mathematical relations for his subsequently abandoned concept of the reflex reserve: "The slope of the extinction curve is a function of the drive of such a sort that curves obtained at different drives can be accurately superimposed by multiplying one curve by a constant representing the ratio of the drives" (p. 423). Skinner (1947) also expected that "A proper theory . . . would characterize the behavior of an individual in such a way that measurement would be feasible if he were the only individual on earth . . . by determining the values of certain constants in equations describing his behavior" (p. 39).

Determinism

Russell. In one instance, Russell (1925) presented determinism as a variant on the "book of nature" metaphor, in this case a book of enormous computing power:

A small number of very general principles . . . determine the past and the future of the world when any small section of its history is known.

Given the laws governing the motions of electrons and protons, the rest is merely geography—a collection of particular facts telling their distribution throughout some portion of the world's history. The total number of facts of geography required to determine the world's history is probably finite; theoretically, they could all be written down in a big book to be kept at Somerset House, with a calculating machine attached, which, by turning a handle, would enable the inquirer to find out the acts at other times than those recorded. (pp. 1–3; also cf. 1914/1981 on surveying “the whole stream of time in one comprehensive vision,” p. 23, and the theoretical existence of a formula “for all the particles in the universe,” p. 78, as well as 1936/1996, pp. 68 and 80, for a more cautious advocacy of determinism in view of quantum physics)

The book of nature metaphor presented an image of knowledge that is settled with an end to it. Some of that knowledge had been read from the book and was well known. Further knowledge came from further reading.

Alternatively, we might consider a metaphor that is different from the organized, unified image of the book of nature. Consider Maxwell's (Campbell & Garnett, 1882–1884/1969) alternative:

Perhaps the “book,” as it has been called, of nature is regularly paged; if so, no doubt the introductory parts will explain those that follow, and the methods taught in the first chapters will be taken for granted and used as illustration in the more advanced parts of the course; but if it is not a “book” at all, but a *magazine*, nothing is more foolish to suppose that one part can throw light on another. (p. 243)

Hacking (1996) also suggested the magazine alternative: “If you must picture the world in a wordy way, why not imagine a periodical?” (p. 63). Which metaphor is more apt? Has science developed like reading the book of nature or like reading the issues in the periodical room of nature?

Despite its lack of verisimilitude to our actual experience, the book of nature metaphor for a deterministic universe might be defended as encouraging the optimistic view that, as the book was read, scientific inquiry would make inevitable progress and improvements in our lives. However, two world wars (with rampant inflation in Ger-

many and a severe depression in the United States in between) undercut such optimism. Dysutopian novels of the future became common (e.g., Huxley, 1932; Orwell, 1949; Zamyatin, 1920–1921/1972), and Moulin (cited in Rouvillois, 2000) would say, “All utopias are totalitarian” (p. 331). A pessimistic determinism, explicit and exact, was portrayed in some of the fiction that became film noir (e.g., Hopley, 1945, pp. 63–68), and a pessimistic view of the outcome of determinism was advanced in other ways. By the end of the 19th century, some thought that the book of nature had been very nearly read, and all that was left was extending the place of decimal numbers. As Michelson (cited in Gingerich, 1975) put it in 1898–1899, “An eminent physicist has remarked that the future truths of Physical Science are to be looked for in the 6th place of decimals” (p. 242). In apparent agreement with the suggestion that science was reaching limits except for decimal places, Russell (1925) said, “Both upward and downward, both in the large and in the small, science seems to be reaching limits. . . . Physical science is thus approaching the stage when it will be complete, and therefore uninteresting” (pp. 1–2).

Skinner. As with other advocates of determinism, the early Skinner (e.g., 1932a, p. 32; 1953a, p. 112) suggested that probability simply reflected an incomplete account of all the relevant variables; and he (1947) assumed the complete reductionism of a thorough determinism would be forthcoming: “Eventually, we may assume, the facts and principles of psychology will be reducible not only to physiology but through biology and chemistry to physics and subatomic physics” (p. 31). As previously indicated in his early regard for mathematics, Skinner (1947) looked forward to a time when theory would account for “the behavior of an individual in such a way that measurement would be feasible if he were the only individual on earth. This would be done by determining the val-

ues of certain constants in equations describing his behavior" (p. 39). Widespread use of mathematical formulations of behavior might lie ahead, but Skinner (1953a) claimed the necessity of a deterministic universe was already behaviorally demonstrable: "When all relevant variables have been taken into account, it is not difficult to guarantee the result—to force the discriminative operant as inexorably as the eliciting stimulus forces its response" (p. 112). Skinner (1953b) likened the development of the appropriate equations for behavior to the development of equations in physics:

The momentary condition of the organism as the tangent of a curve is still an abstraction—the very abstraction which became important in the physical sciences with Newton and Leibniz. But we are now able to deal with this in a rigorous fashion. (p. 77)

Further development would reveal a complete determinism as science progressed: "Personal exemption from a complete determinism is revoked as a scientific analysis progresses" (Skinner, 1971, p. 18). Nevertheless, as with Russell's (1936/1996, p. 68) caution in regard to quantum physics, a similar caution shows in Skinner's (1953a) discussion of the principle of indeterminacy when he said that "human behavior . . . may be beyond the range of a predictive or controlling science" (p. 17).

Positivism

Russell. In the part of *The Problems of Philosophy* that "greatly influenced" Skinner, Russell made a case for positivism. Russell argued that particular immediate experiences provided a foundation of certainty for all further extrapolations. If these extrapolations were logically derived, they too would be certain. Russell (1912/1959) began this quest for certainty at an early age and claimed to have discovered where it was in *The Problems of Philosophy*: "Whatever else may be doubtful, some at least of our immediate experiences seem absolutely certain" (p. 18). De-

spite the equivocation in using "seem" with "absolutely certain," Russell identified the sense data of particular experience as having that certainty: "Absolute, convincing certainty . . . belongs to particular experiences. . . . It is our particular thoughts and feelings that have primitive certainty" (p. 19). Russell's nominalist emphasis on particulars (see Feibleman, 1971, p. 171) and the certainty of immediate sense data (see Carnap, 1963, pp. 50–67) is a positivist declaration. Clarity would be achieved even if this achievement might be trivial or divorced from meaningful contexts.

Skinner. Skinner shifted from a nominalist to a realist position in 1935 (Coleman, 1984), a step in Peirce's direction (Moxley, 2002), but Skinner continued to view himself in the positivist camp in his writing until 1945. In his pre-1945 view, Skinner (1938/1966) said of his scientific method, "It is positivistic. It confines itself to description rather than explanation. Its concepts are defined in terms of immediate observations and are not given local or physiological properties" (p. 44). Recalling his early position, Skinner (1979/1984) said he had seen a close relation between behaviorism and logical positivism: "As far as I was concerned, there were only minor differences between behaviorism, operationism, and logical positivism" (p. 161).

Verbal Behavior

Russell. Perhaps struck by the analogy between if–then reasoning in S-R psychology (if the stimulus, then the response) and if–then reasoning in logic, Russell was receptive to the S-R behaviorism of Watson, and Russell (1938/1996) thought that the meaning of a word was attached to a word like a particular experience was attached to a particular fact: "The meaning of a word is an objective fact, which [the child] discovers just as he discovers the taste of sugar" (p. 363). Watson (1924/1970) claimed that words were substi-

tutes for objects: "The words function in the matter of calling out responses exactly as did the objects for which the words serve as substitutes" (p. 233). Responding to some of Watson's earlier comments to this effect, Russell (1919) said,

If we take some such word as "Socrates" or "dog," the meaning of the word consists in some relation to an object or set of objects. . . . The causes and effects of the occurrence of a word will be connected, in some way to be further defined, with the object which is its meaning. To take an unusually crude instance: You see John, and you say, "Hullo, John"—this gives the *cause* of the word; you call "John," and John appears at the door—this gives the *effect* of the word. . . . This view of language has been advocated, more or less tentatively, by Watson in his book on *Behaviour*. (pp. 7–8)

With a necessary cause-and-effect connection between word and object, meaning was a property of a word, just as a response was a property of a stimulus. In the review that Skinner read, Russell (1926) stated, "I also hold that meaning in general should be . . . regarded as a property of words considered as physical phenomena" (p. 119). This meant that a word had a fixed meaning attached to it regardless of context. Meaning was a property of words like hardness was a property of diamonds.

In *An Outline of Philosophy*, Russell elaborated on the causal relations of meaning in the terms of S-R reflexology. For the listener, Russell (1927/1970) said that within its limits,

The law of conditioned reflexes . . . explain[s] the understanding of words. The child becomes excited when he sees the bottle; this is already a conditioned reflex, due to experience that this sight precedes a meal. One further stage in conditioning makes the child grow excited when he hears the word "bottle." He is then said to "understand" the word. (p. 52)

For the speaker, Russell said,

The reaction of a person who knows how to speak, when he notices a cat, is naturally to utter the word "cat"; he may not actually do so, but he will have a reaction leading towards this act, even if for some reason the overt act does not take place. (p. 54)

These connections, in which meaning

is the property of a word, occurred in the framework of stimulus–response relations and their assumed if–then causality.

Skinner. If, as Skinner said, he had been converted to behaviorism after reading Russell's (1926) review of *The Meaning of Meaning*, what was it in that review that Skinner found so persuasive? That review was not so much about *The Meaning of Meaning* as it was about Russell's own account of meaning-is-a-property-of-a-word view as supported by an S-R analysis. Not long after reading Russell's review, Skinner (1979/1984) wrote a note linking the reflex to meaning and essence: "If all thought can be attributed to processes of perception and reflex, 'meaning' in all its wider sense may prove to be an expanded aspect of 'essence' " (p. 353). This linking of meaning to essence is consistent with Russell's claim that meaning is a property of a word. Skinner (1938/1966, pp. 7–8) also presented illustrative examples of words—to be rejected or retained—whose meaning was a property of the word form (i.e., an essentialist meaning). In these examples, forms that implied a conceptual scheme (i.e., implicated a context for their use) were to be rejected. Midgley (1978, pp. 109–110) criticized Skinner's position, pointing out that the meaning of all words depends on their contexts and that the routine use of words in contexts is naturally theory laden (cf. Hanson, 1955). In addition, S-R frameworks characterize Skinner's early writings on verbal behavior. Employing a stimulus–response model of verbal behavior, Skinner (1936) said: "In normal speech the responses 'refer to' external stimuli—to whatever is being 'talked about' " (p. 103). Consequences do not play a conspicuous role here. The term *verbal behavior* was also used by both Russell and Skinner. In his account of meaning based upon an S-R analysis, Russell (1927/1970) said, "If knowledge is to be displayed by behaviour, there is no reason to confine ourselves to *verbal* behaviour as the

sole kind by which knowledge can manifest itself" (p. 85).

Future Communities

Russell. Speculating on how science might transform society, Russell (1933/1996) thought the "The two chief changes that are being brought about by science are the increased importance of experts and the more organic character of human society" (p. 597). Russell thought that government by experts would largely replace government by the people:

There are many questions which ordinary men and women cannot understand, and in regard to which they are compelled willy-nilly to accept the opinions of specialists. The importance of experts is likely to increase rather than diminish as the part played by science in daily life grows greater. We must therefore expect that, in the future, government by experts will largely replace government by the will of the people, even if the outward forms of democracy are preserved intact. (p. 597)

As for society becoming more organic, Russell saw this as an issue of organization and planning:

In proportion as society becomes more organic, it is necessary that it should be more organized. . . . If our scientific civilization is to be stable, it is imperative that it should become much more organized than it is at present; there must be much more deliberate planning and much less left to the haphazard operation of individual impulse. (pp. 497-498)

The organization of Russell's scientific society of the future required both experts and planners, and he thought this organization had to come at the expense of some individual liberties: "Owing to the increasing need of organization, a scientific society, if it is to be stable, will necessarily involve a diminution of individual liberty as compared with the societies of the past" (p. 598).

In "The World As It Could Be Made," Russell (1918/1993) presented some specific recommendations for an utopian future. These included the 4-hr workday: "With the help of science, and by the elimination of the vast amount of unproductive work involved

in internal and international competition, the whole community could be kept in comfort by means of four hours' work a day" (p. 143). They also included a pay adjustment to make all jobs equally attractive. In the case of unpleasant jobs, "Men could be attracted into these by higher pay or shorter hours . . . the whole community would then have a strong economic motive for finding ways of diminishing the disagreeableness of these exceptional trades" (p. 144). And these recommendations included communal ownership:

Our discussion has led us to the belief that the communal ownership of land and capital, which constitutes the characteristic doctrine of Socialism and Anarchist Communism, is a necessary step towards the removal of the evils from which the world suffers at present and the creation of such a society as any humane man must wish to see realized. (p. 153).

This was a program of social ameliorization.

For education, Russell (1926/1960, pp. 57-59) leaned on some of Watson's research findings for young children. In the "Application of Science to Education," Russell (1928/1996) acknowledged the importance of conditioning as revealed by laboratory work on animals and the difficulties in extending that kind of laboratory research to human beings:

The question of "conditioning" which has been stressed by the behaviourists . . . is undoubtedly very important. . . . The great work of Pavlov on Conditioned Reflexes has provided a wealth of material on this subject, so far as dogs are concerned, but where human beings are concerned, experimentation is much more difficult, although Dr. Watson made some valuable investigations on infants in hospital. (p. 173)

Russell thought the principles could be applied to education:

The hatred of knowledge, which is general among civilized mankind, has been produced by . . . the creation of an association between lessons and punishment. The modern educationalist aims at an entirely opposite kind of conditioning. He aims at providing the children with comparatively easy tasks, which can be surmounted with a moderate degree of effort and which appear interesting from the first. By this method learning is associated with the pleasure derived

from success, and the efforts which it involves come to be met as cheerfully as the muscular efforts involved in football. (p. 173)

Toward this end, Russell (1926/1960) opposed the use of physical punishment in education: "Praise and blame are an important form of rewards and punishments for young children, and also for older boys and girls if conferred by a person who inspires respect. . . . Physical punishment I believe to be never right" (pp. 95–97).

Russell enacted his educational program at Beacon Hill, a school he and his wife Dora founded in an English country home (and estate) that Russell rented from his older brother. Russell and his wife were among the first teachers at Beacon Hill, and Monk's (2000) biography of Russell found that their teaching was highly regarded: "Both of them were born teachers and their lessons are remembered fondly by all who attended them" (p. 94).

Skinner. The organizational structure for Skinner's *Walden Two* (1948), his fictional utopia, resembled Russell's recommendations for a scientific community. For the organizational structure of *Walden Two*, the "only government is a Board of Planners" (p. 54) who might serve up to 10 years. However, these planners (six) were not elected by the people: "The Board selects a replacement from a pair of names supplied by the Managers" (p. 55). These "Managers [were] carefully trained and tested specialists" (p. 55). This organization resembles Russell's recommendations for the organization of a scientific society, and it came as Russell had suggested at the expense of some commonly understood democratic liberties. The *Walden Code* had more rules for restricting speech than for protecting speech (see pp. 163–171). For example, Frazier, the protagonist who designed *Walden Two*, said,

Anyone may examine the evidence upon which a rule was introduced into the Code. He may argue against its inclusion and may present his own evidence. If the Managers refuse to change the rule, he may appeal to the Planners. But in no case must he argue about the Code with the

members at large. There's a rule against that. (Skinner, 1948, p. 164)

Walden Two also restricted access to information about its political workings: "We deliberately conceal the planning and managerial machinery" (p. 235).

The practices in Skinner's *Walden Two* (1948) resemble Russell's recommendations in other ways. The average workday was 4 hr (p. 52), identical to the number of hours Russell had suggested in "The World As It Could Be Made." Credit for work was adjustable: "We simply assign different credit values to different kinds of work, and adjust them from time to time on the basis of demand. . . . When the values have been adjusted, all kinds of work are equally desirable" (p. 52). In addition, there was communal ownership: "All money earned by members belongs to the community" (p. 65). Like Russell's "The World As It Could Be Made," *Walden Two* was a plan for social amelioration.

Showing agreement with Russell's recommendation to apply science to education, Skinner also applied behavioral research to the education of the children in *Walden Two*. In addition, Skinner (1973/1978) said that *Walden Two* somewhat resembled life in an English country house, "It's a simple life, rather reminiscent of an English country house in the nineteenth century" (p. 191). This is the kind of location that Russell used for his school at Beacon Hill. Although we know little of the details of Skinner's knowledge of Beacon Hill, Skinner (1968) mentioned that the school by "Bertrand Russell also failed" (p. 103).

LATER DIFFERENCES BETWEEN RUSSELL AND SKINNER

Mathematics

The later Skinner was less favorably inclined toward introducing mathematical formulas. He (1956/1999a) rejected "the reflex reserve" (p. 119) and abandoned the prospect of predicting

human behavior with mathematical equations. He ceased to use mathematical formulas in his work, and he was a critic of many uses of mathematical statistics. He (1979/1984) said,

I had abandoned my rather amateurish attempts to analyze my data mathematically. The orderly changes in strength in my experiments depended upon too many different conditions to be plausibly described by simple equations. It was easy to fit curves to data if you used enough of those things that can be given different values and hence are called constants. A German physicist once said that with three constants one can draw an elephant and with a fourth make him lift his trunk. There was, nevertheless, great pressure on psychologists to be mathematical, and graduate students with mathematical facility came looking for data to be mathematical about. (pp. 234–235)

In Skinner's later work, the three-term contingency may be called a formula, but it is not a mathematical formula.

In particular, Skinner (1956/1999a) repeatedly objected to misuses of mathematical statistics: "Statistical techniques serve a useful function, but they have acquired a purely honorific status which may be troublesome. Their presence or absence has become a shibboleth to be used in distinguishing between good and bad work" (p. 127). One of the ways that statistics were troublesome was that they tended to take research in the wrong direction:

As now taught, statistics plays down the direct manipulation of variables and emphasizes the treatment of variation after the fact. If the graduate student's first result is not significant, statistics tells him to increase the size of his sample; it does not tell him . . . how to achieve the same result by improving his instruments and the methods of observation. . . . What statisticians call experimental design . . . usually generates a much more intimate acquaintance with a calculating machine than with a behaving organism. (1961/1999, pp. 365–366)

This has the effect of slowing down the development of useful research:

One of the great disservices of statistics to science is likely to be just this: in showing the scientist that something may be significantly inferred from a set of data, statistics encourages him to hold on to these data, and the methods responsible for them, long after they might better have been discarded in favor of more expedient measures. (1956/1999b, p. 553)

The security of arriving at a mathematically acceptable conclusion may come at the expense of further investigation.

In addition to these misuses of mathematics, Skinner (1983/1984) wrote disparagingly of mathematical psychology: for example, "Most of what goes on in mathematical psychology is sheer nonsense" (p. 224). Skinner, of course, had no objection to an appropriate use of mathematics in single-case designs. Skinner's objections appear as an alert to too much rule-governed behavior at the expense of valuable contingency-shaped behavior.

Determinism

Skinner went from a strong, necessitarian type of determinism to a probabilistic foundation for his science (Moxley, 1997a). His exuberant 1947 rhetoric that favored determinism was abandoned, although he (e.g., 1953a, 1971) still alluded to determinism as an acceptable position for a time. Eventually, he presented random variation as a foundational source for his explanatory accounts. Skinner (Trudeau, 1990) insisted, "The origin of human behavior, like the origin of species, has got to be interpreted in terms of randomness and accident" (p. 2). In discussing natural selection, operant conditioning, and cultural evolution, Skinner (1990a) said that "variations are random and contingencies of selection accidental" (p. 1207) and that "if there is freedom, it is to be found in the randomness of variations" (p. 1208). Skinner (1990b) found that

A planned world was one of the casualties of evolutionary theory, and the belief that a life or a culture has evolved according to a plan is suffering the same fate. Too much of what will happen depends upon unforeseen variations and adventitious contingencies of selection. The future is largely a matter of chance (p. 104).

A role for chance—which is prominently if reluctantly appealed to by Darwin and prominently advocated in the philosophy of Peirce—became in-

creasingly prominent in Skinner's views.

All the major pragmatists rejected determinism (e.g., Dewey, 1929/1988, p. 161; James, 1907/1975, pp. 60–61; Peirce, 1892/1992; Schiller, 1939, pp. 207–208), and Skinner joined them, at least to the extent of rejecting a role for determinism in the world as we can know it. Skinner's final position seems more consistent with Schiller (1939) than with Russell. Schiller said,

Complete determination, with the exact prediction it implies, is not an observable fact in any science . . . complete determinism is a gratuitous assumption. For it is a misinterpretation of scientific method to assume that such determinism is a *sine qua non* of scientific inquiry. It is not necessary to conceive it as an ultimate fact in nature. . . . If we want to make a forecast, we must assume that the course of nature is such as to let her course be predicted. But our predictions need not be exact to be serviceable, and any accuracy which goes beyond what suffices for our purpose is a waste of time and effort. . . . As long . . . as it is possible to find habits in nature, it is possible to talk about "laws" of nature. But these "laws" also should not be taken as absolute; they will serve us just as well if taken as statistical averages, and stable habits. We cannot prove them to be more, and it is bad method to assume more metaphysics than we need for purposes of scientific calculation. (pp. 208–209)

Like Schiller, the later Skinner did not need a deterministic foundation for his science. Skinner's selectionist science rested on a probabilistic three-term contingency, and that support was sufficient.

Positivism

In "The Operational Analysis of Psychological Terms," the seminal article for understanding his new views, Skinner (1945) spoke against positivist positions and was interested in addressing "a wider range of phenomena than do current streamlined treatments, particularly those offered by logicians (e.g., Carnap) interested in a unified scientific vocabulary" (p. 271). Commenting later on his 1945 paper, Skinner (Blanshard & Skinner, 1966–1967) said, "The physicalism of the logical positivist has never been good behav-

iorism, as I pointed out twenty years ago (Skinner, 1945)" (p. 325). In this statement, Skinner specifically identifies his 1945 paper as the point for his rejection of "physicalism and logical positivism." Skinner (1945, p. 380) also attacked the positivist reliance on rules or logic, referring to the positivist Feigl (as well as Carnap) for illustration. As verbal behavior, rules were subject to a probabilistic analysis in terms of Skinner's (1945) newly formulated three-term contingency of "a stimulus, a response, and a reinforcement" (p. 272). Rules did not come first; probabilistic three-term contingencies came first.

Verbal Behavior

A sharp departure from his earlier views on meanings is indicated when Skinner (1945) distanced himself from "adherents of the 'correspondence school' of meaning" (p. 274) and repudiated essentialist views of meaning. Skinner said, "It is simply not true that an organism reacts to a sign 'as it would to the object which the sign supplants' " (p. 271), and he (1979/1984) identified those whose views he was rejecting: "It was not true, as Watson, Russell and others had said, that one responded to words as if they were the things the words stood for" (p. 335). Skinner (1974) also rejected Russell's meaning-as-a-property-of-a-word view: "Meaning is not properly regarded as a property of a response or a situation but rather of the contingencies responsible for both the topography of behavior and the control exerted by stimuli" (p. 90). Even when Russell is not identified by name, there is a suspicion that Skinner is aware he is opposing a view held by him. Without naming Russell, Skinner (1957, pp. 123–124) categorically rejected the feasibility of a so-called ideal language that would have one-to-one correspondence between words and empirical events. Russell (e.g., 1922/1981, p. 8) had advocated such a language at one time.

In Skinner's (1945) new view of

meaning, "Meanings, contents, and references are to be found among the determiners, not among the properties, of response" (p. 271), and he presented the determiners of meaning in a probabilistic three-term contingency:

There are three important terms: a stimulus, a response, and a reinforcement supplied by the verbal community. . . . The significant interrelations between these terms may be expressed by saying that the community reinforces the response only when it is emitted in the presence of the stimulus. The reinforcement of the response "red," for example, is contingent upon the presence of a red object. (The contingency need not be invariable.) (p. 272)

Instead of a view of meaning tied to one and only one fixed property, meaning was now in the probabilistic contingencies of behavior: the relations among the stimulus, response, and reinforcement of Skinner's early formulation of his three-term contingency. (Skinner, 1983, p. 156, later preferred different although roughly equivalent terms such as *setting*, *behavior*, and *consequence* with *setting* indicating a more extensive consideration of contexts.) On Skinner's view, the meaning of a word could never be exactly the same when the word was used again, especially when considerations of personal histories and environmental settings are implied by the three-term contingency. There would always be some difference from one time to the next. For practical purposes, most of the details of these differences can be disregarded. A satisfactory response is commonly clear enough, and opportunities for further clarification and narrowing the possibilities of relevant meaning, the meaning needed for an effective response, are reoccurring.

Future Communities

After *Walden Two*, Skinner ceased to suggest that a governing elite of experts needed to come at the expense of democratic values. He advocated no further restrictions on what is understood as "free speech." Rather than impose his earlier philosophical meaning for freedom, Skinner followed his

(1957) view that meanings were in the contingencies of behavior and accepted what people commonly meant by freedom. For example, he (1979/1984) said, "Our culture has failed to design and implement reinforcement contingencies under which people behave in ways in which they feel free and worthy" (p. 50). The implication is that Skinner was in favor of designing a culture that has "people behave in ways in which they feel free and worthy." Skinner (1990a) also said that "if there is freedom, it is to be found in the randomness of variations" (p. 1208). There is no longer an insistence on determinism. The entire episode of *Walden Two* and *Beyond Freedom and Dignity* belongs to Skinner's early similarities with Russell and the cultural values of those years. It does not represent Skinner's later selectionism.

Evolution: A Later Difference with Russell with Little Previous Similarity

Russell. Evolution was a disappointment to Russell. He did not dispute the evidence for it, but he treated it as an unfortunate complication in obtaining a clear view of the universe. Worse, views that relied on evolution were opposed to the views he was advancing. For Russell (1914/1981), evolution had created a disturbance in the orderly conception of the world that had previously existed:

Darwin's *Origin of Species* persuaded the world that the difference between different species of animals and plants is not the fixed immutable difference that it appears to be. The doctrine of natural kinds . . . was suddenly swept away for ever out of the biological world. . . . Thus the old fixed landmarks became wavering and indistinct, and all sharp outlines were blurred. Things and species lost their boundaries, and none could say where they began or where they ended. (p. 24)

Appleman (1949/1979) cites Russell as restating this point with distinct regret: "It seemed that everything, instead of being so and not so, as in the logic books, was only more or less so. And in this mush of compromise all the old splendid certainties dissolved" (p.

295). Russell (1914/1981) favored views that could be presented within a clear logical or mathematical framework, and he was opposed to views "associated with the idea of evolution, and which is exemplified by Nietzsche, pragmatism, and Bergson" (p. 23). For Russell, "Evolutionism, in spite of its appeals to particular scientific facts, fails to be a truly scientific philosophy because of its slavery to time, its ethical preoccupations, and its predominant interest in our mundane concerns and destiny" (p. 30).

Skinner. At a time when he shared many similarities with Russell, Skinner largely ignored evolution. The term *evolution* is not indexed in Skinner's *The Behavior of Organisms* in 1938, nor is it indexed in Skinner's (1999) *Cumulative Record: Definitive Edition* to publications prior to 1947. Before 1945, Skinner (1938/1966) had referenced Darwin critically for attributing "mental faculties to some subhuman species" (p. 4). After 1945, the story is different. Skinner increasingly identified similarities between his views and those of Darwin's natural selection. Skinner wrote articles with titles such as "Selection by Consequences" (1981), in which Skinner showed operant selection in parallel with natural selection, as well as "The Evolution of Behavior" (1984) and "The Evolution of Verbal Behavior" (1986b). In the publication of Skinner's (1990a) final address to the American Psychological Association, "Can Psychology Be a Science of Mind?" the term *evolution* occurs at least once on every page but the last half-page.

Pragmatism

The relation between Russell and Skinner in regard to pragmatism is more complex than the other relations described so far. On the negative side, Russell said some strange things about pragmatism and regarded James and Dewey with disfavor. On the positive side, Russell said some favorable things about pragmatism in regard to

science. Later, Skinner adopted pragmatic views, but he (1979) only spoke favorably of Peirce's pragmatism as a near relation, not James' or Dewey's.

Russell. In understanding Russell's views about pragmatism, the first point to remember is Russell's deep-seated antipathy toward it. In a letter to Lady Ottoline in 1911, Russell said, "I hate pragmatism" (cited in Slater & Köllner, 1996, p. 143), and he had conspicuous disagreements with all the well-known pragmatists of his day. This included the British pragmatist Schiller, designated by Russell (1945/1972, p. 77) as one of the three founders of pragmatism, the others named being James and Dewey. Peirce, with whom Russell also had a dispute (Hawkins, 1997), is curiously omitted as one of the founders of pragmatism. A second point is that Russell often had difficulties showing that he understood pragmatism as the pragmatists understood it. He (1946) admitted that he had not been well read in Peirce. A third point is that Russell shifted around in his views on pragmatism, saying rather favorable things about it, notably to American audiences.

Illustrating his difficulty with pragmatism, Russell (1913/1984) wrote as his understanding of it, "It is not necessary to say that the consequences of the belief must be 'good'—we will merely suppose that there is some property α which they have if the belief is true but not if it is false," which he restated a few lines later as "A belief is *true* when there is a certain corresponding fact, namely that its consequences (with the necessary qualification) have the property α " (p. 151). Russell states multiple problems with this position as he has portrayed it, including, "But why a belief should be called 'true' in this case, it is impossible to see" (p. 151). It is also difficult to see why Russell claims pragmatists believe this. A pragmatist such as Peirce (1878/1992) goes to consequences for the meaning: "Consider what effects, which might conceivably have practical bearings, we conceive

the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object" (p. 132). This widely accepted statement of pragmatism is about the meaning of a conception. We must know the meaning of what we are saying before we can talk about the truth of what we are saying. As Schiller (1927) put it, "Meaning is prior to Truth, and if it cannot be grasped all logical questions become meaningless" (p. 98). Instead of stating pragmatism as pragmatists would state it, Russell converts it into how he thinks it should be stated within his own views, as an issue of true-false propositions.

Russell (1945/1972) referred to "the theory called 'pragmatism' or 'instrumentalism'" (p. 811) and characterized its intellectual aspects as evolutionary and scientific. Evolution created a climate receptive to pragmatism. Russell (1909/1966) said,

The philosophy of evolution has also had its share in generating the pragmatic tone of mind. It has led people to regard everything as fluid and in process of development, everything as passing by imperceptible gradations into everything else. . . . Hence it has come to be felt that all sharp antitheses, such as that of *true* and *false*, must be blurred, and all finality must be avoided. We must always build a road by which everything can pass into everything else at a leisurely pace and with small steps. Instead of "the true" we shall have "the more true," or "the most true up to date." (pp. 105-106)

For its part, science put pragmatism to work. Russell (1909/1966) said, "M. Poincaré . . . has dealt in a thorough pragmatic spirit with the general hypotheses of logic, mathematics, and physics, showing that what leads to the acceptance of a scientific hypothesis is its *convenience*" (p. 106). Equating the pragmatic spirit with convenience betrays perhaps some of Russell's antipathy toward it.

Nevertheless, Russell (1928) wrote about pragmatism and its relation to science in ways that had some similarities with what Skinner would write later on. Russell, for example, said, "Science is becoming increasingly a

manner of life, a way of behaving, and is developing a philosophy which substitutes for the old conception of knowledge the new conception of successful behavior" (p. 65). One aspect of successful behavior was being able to change things as we wished.

In the Instrumental Theory, there is not a single state of mind which consists of knowing a truth—there is a way of acting, a manner of handling the environment, which is appropriate, and whose appropriateness constitutes what alone can be called knowledge as these philosophers understand it. One might sum up this theory by a definition: *To know something is to be able to change it as we wish*. There is no place in this outlook for the beatific vision, nor for any notion of final excellence. (p. 72)

A fixed view of knowledge as filling in a grand, final picture had no relevance here. The theory of eternal knowledge had given way to practice and successful behavior.

There is no longer the same conception of "truth" as something eternal, static, exact, and yet ascertainable. Consequently even the best modern theories are more satisfying to the practical than to the theoretical side of our nature. . . . More and more, science becomes the art of manipulating nature, not a theoretical understanding of nature. The hope of understanding the world is itself one of those day-dreams that science tends to dissipate. This was not formerly the case; it is an outcome of the physics of the last twenty-five years. Undoubtedly it tends to strengthen the instrumentalist philosophy. (pp. 76-77)

Although Russell said he was inclined to accept these new views heralded by pragmatism, he nevertheless had misgivings.

If . . . the instrumental theory of knowledge prevails, and theoretical problems are put to one side as merely scholastic, the inspiration to fundamental discoveries will fail. I am not arguing that the instrumental theory is false; on the contrary, I incline to think that it is true. But I am arguing that it does not afford a sufficient incentive to the precarious labor of serious thinking. (p. 80)

In saying that the replacement of the old philosophy with the new philosophy of pragmatism will cause the inspiration to fundamental discoveries to fail, Russell did not specify what examples of fundamental discoveries

would have failed to be discovered. Whatever Russell's personal preferences, his essay was still an endorsement of pragmatism in science. Russell (1927/1973, pp. 245–246) made similar points in an article originally published in *The New York Times Magazine*.

However, some severe criticism of pragmatism can be found in Russell's (1996) review of "Dewey's New *Logic*," and his philosophical disagreements with Dewey were soon accompanied by an emotional antipathy. Russell first met Dewey at Harvard in 1914 and wrote of that meeting, "To my surprise I liked him very much" (cited in Slater & Köllner, 1996, p. 142). Of his next meeting with Dewey in 1921, Russell (cited in Slater & Köllner, 1996, p. 142) wrote, "In 1914, I liked Dewey better than any other academic American; now I can't stand him" (p. 142).

Russell (1935/1941) even linked James' views to "the modern cult of unreason" (p. 76) and Adolph Hitler:

Hitler accepts or rejects doctrines on political grounds, without bringing in the notion of truth or falsehood. Poor William James, who invented this point of view, would be horrified at the use which is made of it; but when once the conception of objective truth is abandoned, it is clear that the question "what shall I believe?" is one to be settled, as I wrote in 1907, by "the appeal to force and the arbitrament of the big battalions," not by the methods of either theology or science. (p. 77)

Russell, however, did not attempt to explain how wars were any less likely if the beginning focus is on the objective truth of what an opponent is saying instead of first focusing on the meaning of what an opponent is saying. Although linking James to Hitler sounds far-fetched, Russell may have thought the connection between fascism and pragmatism had already been established. Perry (1936), the noted biographer of James, referred to an interview by Benito Mussolini that appeared April 1926 in London in the *Sunday Times*. In response to a question about influences upon him, Mussolini was reported to have said,

The pragmatism of William James was of great use to me in my political career. James taught me that an action should be judged rather by its results than by its doctrinary basis. I learnt of James that faith in action, that ardent will to live and fight, to which Fascism owes a great part of its success. . . . For me the essential was to act. (p. 575)

With this precedent, Russell may have felt justified in extending the link between James and fascism to Hitler. After the war, Russell (1948/1992) linked pragmatism to Marx:

Pragmatism . . . was first promulgated by Marx in his *Theses on Feuerbach* (1845): "The question whether objective truth belongs to human thinking is not a question of theory, but a practical question. The truth, i.e. the reality and power, of thought must be demonstrated in practice. . . . Philosophers have only interpreted the world in various ways, but the real task is to alter it." (pp. 439–440)

In saying this rather general statement is the first expression of pragmatism, Russell still fails to see pragmatism as fundamentally an approach to meaning through consequences.

Note how Russell's quotation from Marx differs from the definition of pragmatism by James (1902) in Baldwin's *Dictionary of Philosophy and Psychology*:

The doctrine that the whole "meaning" of a conception expresses itself in practical consequences, consequences either in the shape of conduct to be recommended, or in that of experiences to be expected, if the conception be true; which consequences would be different if it were untrue, and must be different from the consequences by which the meaning of other conceptions is in turn expressed. If a second conception should not appear to have other consequences, then it must really be only the first conception under a different name. In methodology it is certain that to trace and compare their respective consequences is an admirable way of establishing the differing meanings of different conceptions. (p. 321)

James' definition of pragmatism is highly consistent with Peirce's definition in the same dictionary. This pragmatism has a primary focus on meaning through consequences. It is not a method that determines the real or objective "truth" in our present world, but a method of determining the meaning of concepts. Nor does it demand

any new action other than to attend to the consequences that were or might be entailed by a conception.

Skinner. As with evolution, the early Skinner showed no particular acceptance of pragmatism, whereas the later Skinner explicitly accepted various features of pragmatism and made decidedly accepting statements about Peirce's pragmatism. In "The Operational Analysis of Psychological Terms," Skinner (1945) advanced a pragmatic epistemology that stressed the importance of consequences:

The ultimate criterion for the goodness of a concept is not whether two people are brought into agreement but whether the scientist who uses the concept can operate successfully upon his material—all by himself if need be. . . . This does not make agreement the key to workability. On the contrary, it is the other way round. (pp. 293–294)

In addition, "Modern logic . . . can scarcely be appealed to by the psychologist" (Skinner, 1945, p. 271). Rules do not underlie contingencies. Probabilistic contingencies underlie rules. This view extends to logic, and if it "invalidates our scientific structure from the point of view of logic and truth-value, then so much the worse for logic, which will also have been embraced by our analysis" (Skinner, 1945, p. 277). As verbal behavior, logic was subject to Skinner's probabilistic three-term contingency. Skinner (1979/1984) also referred favorably to a pragmatic comment by Poincaré, a source Russell had cited to illustrate pragmatism in science: "Science was, as Poincaré put it, a rule of action that succeeds" (p. 83). Skinner's position in this essay was favorably referred to by Dewey and Bentley (1947). Later on, Skinner made more explicit statements in favor of the pragmatism of Peirce. When asked in an interview whether operant conditioning was close to any existing philosophical system, Skinner identified Peirce's version of pragmatism. Referring to *Keywords* (Williams, 1983) as a source or reminder, Skinner (1979) gave an accurate restatement of what Peirce had said in "How to Make

Our Ideas Clear" and said, "That is very close, I think, to an operant analysis of the way in which we respond to stimuli" (p. 48).

Although affinities between the views of Skinner and those of pragmatists have frequently been noted (e.g. Day, 1980; Hayes & Brownstein, 1986; Lamal, 1983; Leigland, 1999; Morris, 1988; Schneider, 1997; Zuriff, 1980), Skinner may have had good reasons for not writing more about pragmatism as a near relation to his own views. Critics of pragmatism had long dismissed it as an excuse for "expedient conduct" (Veblen, 1906/1919, pp. 8n and 13n). Perhaps more important, when Skinner began his career, the influence of pragmatism and the functional school of psychology was in decline, and positivism was in ascendancy. According to Day (1980),

Skinner has made no mention so far of intellectual indebtedness to James. Pragmatism can no longer be regarded as the dynamic movement within philosophy that it was during Skinner's formative period: "Pragmatism as a movement . . . cannot be said to be alive today [Thayer, 1967, p. 435]." In the 1930s psychology assumed an epistemological orientation that was dominated by logical positivism. (p. 235)

Understandably, those who came to pragmatism from the secondary literature, such as through Russell's accounts, might hesitate to endorse it unless they had been stimulated to go to the primary sources. In particular, those who relied on Russell would be hesitant to accept views aligned with James and Dewey, whose pragmatic views had been harshly criticized by Russell. When Skinner started to replace his early stimulus–response views with his later selectionist views of behavior, writing about how these views were aligned with pragmatism may not have seemed wise.

Furthermore, at least some behaviorists had adopted positions that were opposed to positions adopted by pragmatists. In a special issue of *The Behavior Analyst* labeled "A Tribute to Skinner," Neuringer (1991) said, "Czubaroff and Nevin correctly iden-

tify behaviorists as determinists" (p. 46). Czubaroff (1991) spoke of the "radical behaviorists' traditional empiricist conception of science," in which "all events are strictly determined" (p. 16); and, in speaking for behaviorism, Nevin (1991) said, "according to the most central tenets of our creed, all behavior is determined by genetic and environmental processes" (p. 36).

These reasons may help to explain why Skinner did not write more about the relation of his work to pragmatism. Marketing his work to others may have seemed like a difficult sell if it was seen as closely related to pragmatism. Furthermore, Skinner (cf. 1980, pp. 194–195; 1986a) may have had some concern about receiving appropriate credit for operant behavior even if he was the one who largely convinced behavior analysts of its value. This need not have been a concern. As Darwin (1958) put it for failing to convince his readers of a point later made by others who were credited with it, "It is clear that I failed to impress my readers; and he who succeeds in doing so deserves, in my opinion, all the credit" (p. 125). Perhaps this statement is a bit extreme, but Darwin (1993, p. 156) had conceded priority for the idea of natural selection to Matthew.

CONCLUSION

Suggesting lifelong similarities and differences, Skinner (1983/1984) noted a parallel between his life and Russell's:

Bertrand Russell . . . played a role in my early professional life and will serve as well at the end. "The serious part of my life," he wrote, "has been devoted to two different objects . . . to find out whether anything could be known and . . . to do whatever might be possible towards creating a happier world." I have devoted myself to the same objects, but in different ways. Whether anything can be known is not to be discovered by speculation but by empirical research, and a happier world is not to be created by talking about what is right but by analyzing and arranging environments in which people behave in happier ways. (pp. 394–395)

Russell might have agreed about their

common goals and that he preferred abstract eternal knowledge. But Russell might not have agreed with the role Skinner implicitly assigned to him as one who simply talked "about what is right." Russell, with his wife Dora, designed and founded Beacon Hill, and Russell was one of its teachers. Russell also went to jail for his pacifism in World War I, showing that he acted upon and accepted some of the practical consequences of his beliefs.

This would not be the first time that Skinner's characterization of Russell could be questioned. According to Skinner (1976/1977), "Russell, again following Watson, was trying to interpret the Law of Effect as an example of the substitution of stimuli" (p. 299). Yet on that very same page Skinner quotes Russell as saying "I do *not* [*italics added*] agree with Watson in thinking this principle [the substitution of stimuli] alone sufficient" (p. 9). In that section, Russell (1927/1970) also objectified the third term of Thorndike's law of effect. Thorndike's law of effect was in terms of situation, response, and satisfaction (or dissatisfaction), but situation and response, an S-R relation, were the only objectively observed terms. Russell said,

Thorndike's law, as it stands does not belong to objective psychology, and is not capable of being experimentally tested. This, however, is not so serious an objection as it looks. Instead of speaking of a result that brings satisfaction, we can merely enumerate the results which, in fact, have the character which Thorndike mentions, namely, that the animal tends to behave so as to make them recur. The rat in the maze behaves so as to get the cheese, and when an act has led him to the cheese once, he tends to repeat it. We may say that this is what we mean when we say that the cheese "gives satisfaction." . . . The law should then say: there are situations such that animals tend to repeat acts which have led to them. (pp. 35–36)

The ingredients were here for formulating an objective, probabilistic three-term contingency. Inasmuch as Skinner (1976/1977, p. 299) refers to pages 33 and 34 that he had previously marked in Russell's (1927/1970) book and quotes from pages 33, 34, and 36, we

may reasonably assume that Skinner had probably read Russell's reformulation of Thorndike's law of effect (pp. 35–36) even if he did not attribute significance to it (Skinner was still committed to S-R units at the time; cf. Moxley, 1998, p. 75).

In Russell's reformulation of Thorndike's law of effect and in his previous accounts favorable to pragmatism as a view for science, Russell may have prepared the way for Skinner's (1979, p. 48; 1979/1984, p. 41) receptivity to Peirce and even for Skinner's (1979/1984, p. 41) acquisition of Peirce's (1923/1998) essays in *Chance, Love and Logic*, which contained the essay, "How to Make Our Ideas Clear." The shift in Skinner's views that became pronounced in 1945 (Moxley, 1999b, 2001a, 2001b) can largely be seen as a shift away from views supported by Russell to views supported by Peirce. Much that is puzzling and seemingly contradictory in the development of Skinner's views can be at least partially explained as a shift in shared similarities of ideas, from Russell to Peirce, and Russell himself may have assisted this shift.

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